

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

REC'D 13 JUN 2005

WIPO



PCT

Applicant's or agent's file reference WO 37443		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/03934	International filing date (day/month/year) 15.04.2003	Priority date (day/month/year) 15.04.2003	
International Patent Classification (IPC) or both national classification and IPC H02K5/04			
Applicant HONEYWELL INTERNATIONAL INC. et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 12.11.2004	Date of completion of this report 10.06.2005
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Di Giorgio, F Telephone No. +49 89 2399-7289 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/03934**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-10 as originally filed

Claims, Numbers

2-19 received on 11.01.2005 with letter of 11.01.2005
1 received on 12.05.2005 with letter of 12.05.2005

Drawings, Sheets

1/2-2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/03934**

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

see separate sheet

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	6,8-11,14-16
	No: Claims	1-5,7,12-13,17-19
Inventive step (IS)	Yes: Claims	8-11,14-16
	No: Claims	6
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP 03/03934

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: US-A-4 253 031 (FRISTER MANFRED) 24 February 1981 (1981-02-24)
- D2: WO 02/23047 A (HONEYWELL INT INC) 21 March 2002 (2002-03-21)
- D3: EP-A-0 388 147 (HITACHI LTD ;HITACHI AUTOMOTIVE ENG (JP)) 19 September 1990 (1990-09-19)
- D4: GB-A-2 335 710 (AISIN SEIKI) 29 September 1999 (1999-09-29)
- D5: EP-A-0 420 666 (ISUZU MOTORS LTD) 3 April 1991 (1991-04-03)
- D6: EP-A-0 304 259 (ISUZU MOTORS LTD) 22 February 1989 (1989-02-22)
- D7: DE 195 18 317 A (RECKERTH HUGO ;HUBER GERHARD DR ING (DE)) 21 November 1996 (1996-11-21)

1. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.

The document D1 discloses an electric motor cartridge (the references applying to this document) comprising a first cartridge housing portion 12 and a second cartridge housing portion 13, the cartridge housing portions 12, 13 being coupled together so as to assemble the electric motor cartridge by radially and axially positioning a stator 11 there between, wherein each cartridge housing portion 12, 13 has a semi-shell shape substantially comprised by a bottom portion and a cylindrical wall portion, wherein each cartridge housing portion 12, 13 provides a bore in the center of its bottom portion for receiving respective portions of a rotor 6 (cf. D1 and in particular column 3, line 1-column 4, line 31 and figure 1).

2. The amendments filed with the letter dated 11.01.2005 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendment concerns the introduction, in claims 12 and 13, of the feature consisting in that **the rotor 21** (the references applying to the present application) **is supported by the bores 12, 13.**

The term "support" is not present in the application as originally filed. Therefore the above-mentioned feature should be derived from the description as implicitly disclosed, wherein it is explained that:

- A) the first and second portions 22 and 23 of the rotor are received in the respective central opening of the corresponding housing portion, and
- B) that piston rings tightly close the gaps between the first and second portion of the rotor and the central bores, respectively.

The feature **A** refers to portions of the rotor being only **received** in openings, and no supporting action for the rotor can be therefrom derived.

The feature **B** mention piston rings, which are designed for **sealing** between the inside and the outside of the cartridge, as supported by claim 15 as originally filed.

On the contrary, on page 9 lines 32 to 37 of the description, details of a bearing portion 43 of the shaft 34 are given, from which a supporting action for the rotor can be implicitly derived, but in a location different from the bores of the cartridge portions.

Therefore no basis in the application as filed can be found for this feature, which is considered not allowable.

3. Dependent claims 2-5, 7, 17 (as long as it can be understood, as it refers to an electric motor and not to an electric motor cartridge), 18 and 19 do not seem to contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty, see documents D1 to D7 and the corresponding passages cited in the search report.

Enclosure of May 12, 2005

PCT-Application No.: PCT/EP03/03934

Applicant: HONEYWELL INTERNATIONAL INC. et al.

Our ref: WO 37443

5

New claim 1

1. Electric motor cartridge (1) comprising:

10 a first cartridge housing portion (2); and

a second cartridge housing portion (3);

the cartridge housing portions (2, 3) being coupled
together so as to assemble the electric motor cartridge (1)
by radially and axially positioning a stator (4) there

15 between,

characterized in that

each cartridge housing portion (2, 3) has a semi-shell
shape substantially comprised by a bottom portion (5, 6)
and a cylindrical wall portion (7, 8), wherein

20 each cartridge housing portion (2, 3) provides a bore (12,
13) in the center of its bottom portion (5, 6) for
receiving respective portions of a rotor (21).

Enclosure of January 11, 2005

International Patent Application No.: PCT/EP03/03934

Applicant: HONEYWELL INTERNATIONAL INC.

Our ref: WO 37443

5

New claims 1 to 19

- 10 1. Electric motor cartridge (1) comprising:
a first cartridge housing portion (2); and
a second cartridge housing portion (3);
the cartridge housing portions (2, 3) being coupled
together so as to assemble the electric motor cartridge (1)
15 by radially and axially positioning a stator (4) there
between,
characterized in that
each cartridge housing portion (2, 3) has a semi-shell
shape substantially comprised by a bottom portion (5, 6)
20 and a cylindrical wall portion (7, 8), wherein
each cartridge housing portion (2, 3) provides a bore
(12, 13) in the center of its bottom portion (5, 6) for
supporting respective portions of a rotor (21).
- 25 2. Electric motor cartridge (1) according to claim 1,
wherein at least one of the cartridge housing portions (2,
3) is provided with at least one recess portion (9, 10)
formed at the inner side of the axial end portion of the
cylindrical wall portion (7, 8) which extends at least
30 partially in the circumferential direction of the
cylindrical wall (7, 8) for receiving a projection (11) of
the stator (4).
- 35 3. Electric motor cartridge (1) according to claim 2,
wherein each cartridge housing portion (2, 3) is provided
with one recess portion (9, 10), wherein the recess

portions (9, 10) are symmetrically to a plane defined by the abutting tips of the cylindrical wall end portions.

4. Electric motor cartridge (1) according to claim 3,
5 wherein at least one of the bottom portions (5, 6) is formed at least partly concave inwardly.

5. Electric motor cartridge (1) according to claim 4,
10 wherein at least one contact area (14, 15) is formed at each of the cartridge housing portions (2, 3) so as to be in contact with respective counter contact areas of two housings (18, 19) between which the cartridge (1) is fittable.

15 6. Electric motor cartridge (1) according to claim 5, wherein in at least one of the cartridge housing portions (2, 3) a circumferentially extending groove (16) is disposed so as to receive an o-ring (17) for sealing
20 between the cartridge housing (2, 3) and one of the two housings (18, 19) between which the cartridge (1) is fittable.

7. Electric motor cartridge (1) according to any one of the preceding claims, wherein cooling slits and any integrated
25 piping for motor cooling is integrated in at least one of the cartridge housing portions (2, 3).

8. Electric motor cartridge (1) according to any one of the preceding claims, wherein the cartridge housing (2, 3) is
30 made of punched metal, any polymer potted material, any die casting material or any sand casting material.

9. Electric motor cartridge (1) according to claim 8, wherein the properties of the material of the cartridge

housing (2, 3) contributes to heat evacuation and heat protection.

5 10. Electric motor cartridge (1) according to any of the preceding claims, wherein the material properties of the cartridge housing contributes to electromagnetic interference protection.

10 11. Electric motor cartridge (1) according to any of the preceding claims, wherein at least one of the cartridge housings (2, 3) comprises a connector portion (20) for phases and sensor connections of an compressor motor.

15 12. Electric motor comprising an electric motor cartridge (1) according to any of claims 1 to 11 and a rotor (21) being encompassed by the stator (4) and supported by the bores (12, 13).

20 13. Electric motor according to claim 12, wherein the rotor (21) comprises two peripheral portions (22, 23) each having a smaller diameter compared to the diameter of a middle portion of the rotor (21) encompassed by the stator, each peripheral portion (22, 23) comprising a circumferential groove (24, 26) provided with a piston ring (25, 27) for
25 sealing between the inside and the outside of the cartridge (1), wherein the rotor (21) is supported at the two peripheral portions (22, 23) by the bores (12, 13).

30 14. Electric motor according to claim 12 or 13, further comprising material removal areas on said rotor (21) providing a unitary rotational mass distribution of the rotor.

15. Electric motor according to claim 12, 13 or 14 further comprising a sensor member (28) for detecting the speed of the rotor (21).

5 16. Electric motor according to any of claims 12 to 15, wherein phases and sensors connections are arranged in the connector portion (20) such that they plug directly to wiring end connections when assembling the compressor motor.

10

17. Turbocharger comprising an electric motor according to any of claims 12 to 16 and further comprising

a turbine housing (18) for accommodating a turbine wheel (29) driven by exhaust gas;

15 a center housing (31) for accommodating a shaft (34) and the electric motor, the shaft serving as a rotor (21) of the electric motor and extending from the turbine wheel (29) through a journal bearing (35) and the electric motor to a compressor wheel (32);

20 a compressor housing (19) for accommodating the compressor wheel (32); wherein

the compressor wheel (32) is driven by the turbine wheel (29) via the shaft (34) and can additionally be driven by the electric motor, and

25 the electric motor is accommodated in the center housing (31) such that the electric motor is firmly fixed by connecting the center housing (31) to the compressor housing (19).

30 18. Turbocharger according to claim 17, wherein one of the cartridge housing portions (2) serves as a seal plate on the journal bearing (35) side and the other cartridge housing portion (3) serves as a backplate on the compressor wheel (32) side.

35

19. Compressor comprising an electric motor according to any of claims 12 to 16 and further comprising

a motor housing for accommodating a shaft and the electric motor, the shaft serving as a rotor of the

5 electric motor and carrying a compressor wheel; and

a compressor housing for accommodating the compressor wheel; wherein

the electric motor is accommodated in the motor housing such that the compressor motor is firmly fixed by
10 connecting the motor housing to the compressor housing.